viscoelastometry and a molecular weight distribution index (PDI) of 1 to 18 which is expressed by $\omega_2/10\omega_1$ wherein ω_1 is an angular frequency at which a storage modulus (G') as measured by melt viscoelastometry is 2×10^2 Pa and ω_2 is an angular frequency at which a storage modulus (G') as measured by melt viscoelastometry is 2×10^4 Pa, and

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(3) the solubles (b) having an intrinsic viscosity [η] (in decalin at 135°C) of 3.3 dl/g or higher and an ethylene unit content of 33 to 39% by weight;

(B) 0 to 10% by weight of an elastomer; and

(C) 10 to 30% by weight of talc.

REMARKS

Claim 2 is deleted. Claims 1 and 3 are now active in the application.

Claim 1 is amended to incorporate the content of deleted Claim 2. In effect, Claim 1 as amended is effectively Claim 2 written in independent form.

Claim 1 is also amended to delete "rubber-like" as a modifier of "elastomer".

THE DETAILED ACTION

Reconsideration and withdrawal of the rejection of Claim 1 under 35 U.S.C. § 112, second paragraph, is requested.

The rationale for the rejection is expressed in the criticism of the term "rubber-like". The term is now deleted as in any event a redundancy. By definition, an elastomer is a material that exhibits rubbery properties. The attached copies of pages of 905 to 908 of Vol. 8 of Kirk-Othmer, Fourth Edition is the support for that statement.

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Reconsideration and withdrawal of the rejection of Claims 1 and 3 under 35 U.S.C. § 102(b) or 35 U.S.C. § 103(a) as anticipated or obvious over U.S. 6,034,165 to Tomomatsu et al are requested.

The rejection is moot in view of the amendment to Claim 1 incorporated the substance of Claim 2, indicated to be allowable. Claim 3, as previously amended, depends only from amended Claim 1.

Favorable reconsideration is solicited.

Respectfully submitted,

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Serial No: 09/674,498
Amendment Filed: HEREWITH

IN THE CLAIMS

--1. (Amended) A propylene-based resin composition comprising:

(A) 60 to 90% by weight of a propylene-based resin,

(1) comprising 78 to 88% by weight of 23°C p-xylene insolubles (a) and 12 to 22% by weight of 23°C p-xylene solubles (b),

(2) the insolubles (a) having an isotactic pentad fraction of 95% or higher, a relaxation time (τ) of 0.01 to 0.35 second at an angular frequency (ω) of 10°/sec when measured by melt viscoelastometry and a molecular weight distribution index (PDI) of 1 to 18 which is expressed by $\omega_2/10\omega_1$ wherein ω_1 is an angular frequency at which a storage modulus (G') as measured by melt viscoelastometry is 2×10^2 Pa and ω_2 is an angular frequency at which a storage modulus (G') as measured by melt viscoelastometry is 2×10^4 Pa, and

(3) the solubles (b) having an intrinsic viscosity [η] (in decalin at 135°C) of 3.3 dl/g or higher and an ethylene unit content of [43%] <u>33 to 39%</u> by weight [or smaller];

(B) 0 to 10% by weight of [a rubber-like] <u>an</u> elastomer; and

(C) 10 to 30% by weight of talc.

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FOURTH EDITION

VOLUME 8

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TO
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EINSTEINIUM. See ACTINIDES AND TRANSACTINIDES.

ELASTOMERS, SYNTHETIC

SURVEY

The purpose of this article is to provide a brief overview of the materials designated synthetic elastomers and the elastomeric or rubbery state. Subsequent entries describe the individual classes of elastomers in detail. Table 1 provides a fundamental description of the principal classes of synthetic elastomers. Table 2 gives the widely accepted ASTM abbreviations for synthetic rubbers.

Definition of Elastomers

The term elastomer is the modern word to describe a material that exhibits rubbery properties, ie, that can recover most of its original dimensions after extension

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Table 1. Elastomers[a] and Their Characteristics

Name	CAS Registry Number	Chemical name	Repeat unit structure	Vulcanizing agent	Stretching crystallization	Gum tensile strength
natural rubber	[9006-04-6]	*cis*-1,4-polyisoprene (>99%)	[b]	sulfur	good	good
styrene–butadiene rubber	[9003-55-8]	poly(butadiene-*co*-styrene)	$-(CH_2-CH=CH-CH_2)_m-(CH_2-\underset{C_6H_5}{\underset{\mid}{CH}})_n-$	sulfur	poor	poor
butadiene rubber	[9003-17-0]	polybutadiene (>97% cis,-1,4)	$-(CH_2-CH=CH-CH_2)-$	sulfur	poor to fair	poor to fair
isoprene rubber	[9003-31-0]	*cis*-1,4-polyisoprene (>97%)	$-(CH_2-\overset{CH_3}{\overset{\mid}{C}}=CH-CH_2)-$	sulfur	good	good
EP(D)M	[c,d]	poly(ethylene-*co*-propylene-*co*-diene)[c]	$-(CH_2-CH_2)_m-(\underset{CH_3}{\underset{\mid}{CH}}-CH_2)_n-(\underset{CH=CH_2}{\rule{3em}{0.4pt}})_o-$	sulfur	poor	poor
butyl rubber	[9010-85-9]	poly(isobutyene-*co*-isoprene)	$-(CH_2-\overset{CH_3}{\underset{CH_3}{C}})_{60}-(CH_2-\overset{CH_3}{\overset{\mid}{C}}=CH-CH_2)-$	sulfur	good	good
nitrile rubber	[9003-18-3]	poly(butadiene-*co*-acrylonitrile)	$-(CH_2-CH=CH-CH_2)_m-(CH_2-\underset{CN}{\underset{\mid}{CH}})_n-$	sulfur	poor	poor

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chloroprene rubber	[9010-98-4]	polychloroprene (mainly trans)	$+\!\!\left(CH_2-\underset{\displaystyle Cl}{\underset{\vert}{C}}=CH-CH_2\right)\!\!+$	MgO or ZnO	good	good
silicones		polydialkylsiloxane (mainly polydimethylsiloxane)	$+\!\!\left(\overset{\displaystyle R}{\overset{\vert}{\underset{\displaystyle R}{\underset{\vert}{Si}}}}-O\right)\!\!+$	peroxides	poor	poor
fluorocarbon elastomers		poly(vinylidene fluoride-*co*-hexafluoropropene)	$+\!\!\left(CH_2-CF_2\right)_x\!\left(CF_2-\underset{\displaystyle CF_3}{\underset{\vert}{CF}}\right)_y$	diamines	poor	poor
polysulfide rubber		poly(alkylene sulfide)	$+\!\!\left(CH_2-CH_2-S_{2-4}\right)\!\!+$	metal oxides	fair	poor
polyurethanes		polyurethanes	$HO\!\left(R-OCONHR'NHCOO\right)_x R-OH$	diisocyanate	fair	good

[a]Not inclusive; see also ACRYLIC ELASTOMERS, PHOSPHAZENES, CHLOROSULFONATED POLYETHYLENE, ETHYLENE–ACRYLIC ELASTOMERS, POLYETHERS under the title ELASTOMERS, SYNTHETIC.
[b]See ISOPRENE RUBBER.
[c]o = zero for ethylene–propylene rubber; poly(ethylene-*co*-propylene) [9010-79-1].
[d][25038-36-2] when the diene is norbornene.

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Table 2. ASTM Elastomer (Rubber) Designations

Abbreviation	Elastomer
ABR	acrylate–butadiene
BR	butadiene
CR	chloroprene
EPM	ethylene–propylene
EPDM	ethylene–propylene–diene[a]
IR	isoprene
IM	isobutylene
IIR	isobutylene–isoprene or butyl rubber
SBR	styrene–butadiene
SIR	styrene–isoprene
NBR	acrylonitrile–butadiene
NCR	acrylonitrile–chloroprene
PBR	vinylpyridine–butadiene
PSBR	vinylpyridine–styrene–butadiene
XNBR	carboxylic-acrylonitrile–butadiene
XSBR	carboxylic-styrene–butadiene
CIIR	chloroisobutylene–isoprene or chlorobutyl rubber
BIIR	bromoisobutylene–isoprene or bromobutyl rubber
MQ	dialkysiloxane
GPO	poly(propylene oxide)
AU	polyesterurethanes
EU	polyetherurethanes

[a]Nonconjugated diene; residual unsaturation from the diene is in the pendent group.

or compression. Ever since the pioneering work of Staudinger in the early 1900s (1), it has been accepted that such rubbery behavior results from the fact that the material is composed of a tangled mass of long-chain, flexible polymer molecules. When such a material is extended or stretched, the individual long-chain molecules are partially uncoiled, but will retract or coil up again when the force is removed because of the kinetic energy of the segments of the polymer chain. The flexibility of such polymer-chain molecules is actually the result of the ability of the atoms comprising the chain to rotate around the single bonds between them. Theories of rubberlike elasticity are well-developed (2).

The properties of elastomeric materials are also greatly influenced by the presence of strong interchain, ie, intermolecular, forces which can result in the formation of crystalline domains. Thus the elastomeric properties are those of an amorphous material having weak interchain interactions and hence no crystallization. At the other extreme of polymer properties are fiber-forming polymers, such as nylon, which when properly oriented lead to the formation of permanent, crystalline fibers. In between these two extremes is a whole range of polymers, from purely amorphous elastomers to partially crystalline plastics, such as polyethylene, polypropylene, polycarbonates, etc.

A most interesting class of materials is comprised of those amorphous elastomers that show the ability to undergo a temporary crystallization when

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